

SOUTHEAST MISSOURI STATE UNIVERSITY

Department of Physics and Engineering Physics
Title of Course: Engineering Design and Research

Course No. EP380
Proposed Start: Spring 2013

I. Catalog Description:

This course offers an in-depth introduction to the engineering design and research process. Students will form design teams, learn necessary background materials, and initialize several multiple-semester engineering design and research projects. Lectures are given on both technical background materials and design process and methods. Two-hour lab. One credit hour.

II. Prerequisites:

UI330.

III. Student Learning Objectives:

At the end of the course,

1. Students will be able to demonstrate the ability to apply content and methods from their major disciplines to propose several possible solutions to a design problem.
2. Students will be able to demonstrate the ability to evaluate the tradeoffs of various design solutions based on design specifications and constraints and to choose the best solution.
3. Students will be able to demonstrate the ability to follow the principles of time management, team management, and professional ethics in the design project.
4. Student will be able to demonstrate the ability to consider the legal/social/economical/environmental impacts of engineering activities.
5. Students will be able to demonstrate the ability to document design specifications, design processes, and test results in a professional manner.

IV. Expectations of Students:

Students should attend all classes and labs, form design teams, learn necessary background materials, and initiate multiple-semester design projects. Students should also keep a good record of the design and research activities and turn in required documents.

V. Course Content and Outline:

Topics	Time (in weeks)
1. Introduction to engineering and research	1
2. Project selection and requirements specification	1
3. Concept Generation and Evaluation	1
4. Teams and teamwork	1
5. Background knowledge and literature research	4
6. Project activities	6
7. Documentation and written communication	1
	Total: 15 weeks

VI. Textbook:

There is no required textbook for this course. The following books are recommended:

The following books focuses on design process in electrical and computer engineering:

- Ralph M. Ford and Chris S. Coulston, *Design for Electrical and Computer Engineers: Theory, Concepts, and Practice*, McGraw-Hill, 2008

The following book is geared toward design processes in mechanical engineering:

- George Dieter and Linda Schmidt, *Engineering Design*, 5th edition, McGraw-Hill, 2012.

VII. Basis of Student Evaluation (percentages are approximate and may vary):

- A. Homework and written assignments (10%)
- B. Design and research project notebook (40%)
- C. Design and research documentation (20%)
- D. Final report (30%)

VIII. Academic Policy Statement:

Students will be expected to abide by the University Policy for Academic Honesty regarding plagiarism and academic honesty. Refer to: <http://www6.semo.edu/judaffairs/code.html>

IX. Student with Disabilities Statement:

If a student has a special need addressed by the Americans with Disabilities Act (ADA) and requires materials in an alternative format, please notify the instructor at the beginning of the course. Reasonable efforts will be made to accommodate special needs.